ADMINISTRATION REPORT OF MILITARY WORKS

OF THE

PUBLIC WORKS DEPARTMENT,

BOMBAY PRESIDENCY,

FOR THE YEAR

1886-87.

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MILITARY WORKS.

1. The places within the limits of the Bombay Presidency at which Bombay Troops are stationed, and the buildings in which are in charge of the Bombay Public Works Department, are as follows:—

Army Division or District.	Name of Station.	Executive District.	Superintending Division.
Northern Division of the Army.	Ahmedabad	Executive Engineer, Ahmedabad.	Superintending Engineer, Northern Division.
	Rájkot		
	Bhúj		
	Baroda		
	Surat	Executive Engineer, Surat.	
Bombay District ...	Bombay	Executive Engineer, Bombay Defences.	
	Colába		
	Devláli		
	Thána	Executive Engineer, Thána.	
Poona Division of the Army.	Poona	Executive Engineer, Poona and Kirkee.	Superintending Engineer Central Division.
	Kirkee		
	Sirúr	Executive Engineer, Poona District.	
	Purandhar ...		
	Khandála ...		
	Ahmednagar ...	Executive Engineer, Ahmednagar.	
	Sholápur ...	Executive Engineer, Sholápur.	
	Sátára	Executive Engineer, Sátára.	
	Málegaon ...	Executive Engineer, Khándesh.	
Sind District ...	Karáchi... ...	Executive Engineer, Lower and Central Sind.	No Superintending Engineer.
	Ghizree		
	Hyderabad ...		
	Jacobabad ...		
Aden Brigade ...	Aden	Executive Engineer, Aden.	
	Perim		

2. In addition to the foregoing stations, the Bombay Public Works Department has in its charge the buildings in the station of Belgaum in the Southern Division, now garrisoned by Madras Troops. The troops which, until recently, garrisoned Dhárwár and Kolhápur, have been withdrawn to Belgaum. The Military Lines in Dhárwár have, therefore, been handed over for the accommodation of the Police stationed there.

3. In Kolhápur the Native Infantry Lines and subsidiary buildings have been handed over to the Kolhápur State. The temporary European Barracks and out-buildings have also been taken over by the State, but on loan. The State will keep them in repair, and in the event of troops being sent

to Kolhápur, these barracks will always be available for the use of Government. The remaining military buildings have been sold by auction, and the proceeds credited to Imperial Revenue Receipts, Military.

4. The expenditure under the head Military (including Contributions) in 1886-87 amounted to Rs. 22,35,447, of which Rs. 8,23,995 was for Defence Works. The balance, Rs. 14,11,452, included Rs. 5,16,810 for Original Works, Rs. 5,03,344 for Repairs, Rs. 2,38,974 for Establishment, Rs. 15,290 for Tools and Plant, and Rs. 1,37,034 for Barrack Department.

5. Following the usual course, the operations of the year are described under the several heads laid down in the regulations for the classification of expenditure on Military Works.

1.—ACCOMMODATION FOR TROOPS.

Buildings for European Troops in the Plains.

Bombay Defences. New Barracks at Colába.

6. The additions to the permanent barracks for European Troops at Colába, the scheme of which was explained in the Administration Report of 1885-86, were carried on during this year, by commencing the construction of two new barracks on the north and south flanks. These two buildings, with their various out-houses, were finished up to plinth level during the year, at an expenditure of Rs. 42,578 for the buildings, and Rs. 35,928 for material supplied, *viz.*, the iron work of roofs and floors; the total expenditure from the commencement of the work being Rs. 91,407.

7. Amongst minor works at Colába, (1) a new latrine for the use of Native followers was constructed at a cost of Rs. 1,448, the funds for this work being a contribution from the Colába Board of Health; (2) Iron railings to the verandhas of the Artillery Barracks at a cost of Rs. 1,229; and (3) a small store-room, for the Depôt Barracks, Colába, was constructed at a cost of Rs. 2,330.

Ahmedabad.

8. The Station Hospital for European Troops at Ahmedabad has been fully described in former Administration Reports. The main building is upper-storeyed, with accommodation for 24 beds, and the female hospital, close by, provides 6 beds. The buildings have been completed, with the exception of the arrangement for water-supply, for which a pump and pipes have lately been received from England, and will be fitted up shortly. The buildings have been occupied since August 1885. During the year 1886-87 a verandah, 6 feet wide, has been added to servants' quarters, and a tank provided to the hospital tower. The estimate for the hospital work amounts to Rs. 1,95,802, and the expenditure up to end of 1886-87 to Rs. 1,92,906, out of which Rs. 1,247 were spent in the year under report.

Ghorepuri.

9. Previous to 1886, the Ghorepuri Barracks for European Infantry, owing to their reputed unhealthiness, had been unoccupied for 4 years. Government then decided to re-occupy them, and a large sum of money, Rs. 29,886, has been spent in special repairs. One barrack also has been altered according to the views of the Sanitary Commissioner, at a cost of Rs. 7,619. The buildings are now in the occupation of the 2nd Battalion, Durham Light Infantry.

Kirkee.

10. A fourth battery of Royal Artillery having been quartered at Kirkee, a set of temporary stables has been run up. No other accommodation has been provided, except a staff serjeant's and a school-master's quarters: consequently the troops are somewhat crowded. One additional barrack, a school, and some subsidiary buildings, are still required.

Kirkee (New Jhansi).

11. A Telegraph School for the Sappers at New Jhansi has been constructed.

Devlálí.

12. Several minor additions were made during the year at Devlali, consisting of (1) a cook-house of stone and lime for the new married officers' quarters at a cost of Rs. 2,604, which completed the project of the new married officers' quarters, carried out in 1885-86, at a total cost of Rs. 36,923: 2) a new rifle range up to 1,000 yards was commenced and nearly completed at an expenditure of Rs. 1,206.

Buildings expected to yield a return on their outlay.

Bombay Defences.

13. The new permanent quarters for Officers in the Marine Lines, described fully in last year's report, were completed, as regards the buildings themselves, about the beginning of 1887, but owing to the non-completion

of the drainage system, they were not handed over for occupation. The total expenditure incurred up to date was Rs. 1,39,209, the estimate being Rs. 1,39,648.

14. The connecting of the officers' bungalows and regimental buildings in the Marine Lines with the Municipal system of drainage, described in last year's report, was continued and completed during the year, as far as the actual connections are concerned. The system is, however, only in action as regards the conveyance away of bath-room and cook-room water, &c. In the new officers' quarters intermittent self-acting flushing tanks have been provided to the servants' latrines, and four of the manholes have been provided with flushing arrangements. If these latter arrangements are found to act, the system will probably be applied to all the bungalows, but the whole scheme at present is under discussion. The expenditure to the end of the year was Rs. 13,435. In connection with the above, the fencing on the west side of the Marine Lines, next to the Queen's Road, has been taken up and re-fixed in a new alignment, at a cost of Rs. 1,390.

15. A new permanent Assistant Commissary's quarters at Devláli, comprising one sitting room 24′ × 16′, two bed-rooms 16′ × 16, two bath-rooms and one dressing-room, 5 servants' quarters, 10′ × 10′, cook-house and stable, was commenced and completed during the year, at a cost of Rs. 9,516, against the sanctioned estimate of Rs. 9,993. Devláli.

Buildings for Native Troops.

16. The extension of the hospital used by the 17th Native Infantry, so as to make one building to contain the hospitals of both the Native Infantry Regiments, was commenced during the year, and an expenditure to the extent of Rs. 7,878 incurred. This project also includes conversion of the present hospital of the Marine Battalion into a pendall, and the total cost is estimated at Rs. 45,585. Bombay Defences.

17. Arm racks, according to the standard plan, were provided in all the pendalls of the 21st Regiment, Native Infantry, at the Marine Lines, at a cost of Rs. 1,201; and a certain amount of the fencing in the Native Infantry Lines at the Marine Lines was removed and renewed at a cost of Rs. 4,488.

18. Quarters for two Native Doctors and two Medical pupils attached to the Native Infantry Hospital, Camp Baroda, have been completed according to the sanctioned plan and estimate. They consist of a room, 16′ × 12′, at either end, for Native Doctors, with a bath-room in verandah, 8′ × 6′, at each corner, a zenana compound in the rear, 32′ × 16′, and two rooms in the centre, 12′ × 12′, each for medical pupils. The building has brick and lime masonry walls, asphalte floors, and double country tiled roof with cut-teak rafters. The amount of sanctioned estimate was Rs. 5,615, and the expenditure Rs. 5,099. Ahmedabad.

19. During the year pendalls and subsidiary buildings and Native Officers' quarters occupied by the Depôt Lines, at Camp Ahmedabad, as well as the Native Pendalls called the Golundaze Lines, which were not required for use, have been removed, and their materials sold, realising a sum of Rs. 1,218-6-0.

Quarters for Defence Lascars.

20. The original estimate amounted to Rs. 4,677, but, for reasons explained to Government, a revised estimate was submitted, and has been sanctioned for Rs. 5,180. Aden. Isthmus Position.

21. The building is designed to accommodate 16 married lascars, and consists of 16 rooms, each 10′ × 11′ 6″, in 2 sets of 8 rooms, back to back, the longitudinal (or back) partition being made of Aden reed and pumice mortar, plaster walling on dealwood framing, the scantlings of which are as follows, *viz.*, posts 3″ square, top and bottom rails 2″ × 3″, intermediate horizontal pieces 2½″ × 1½″. The end, side, and cross partition walls are all of coursed rubble masonry, 2nd sort, and 9 feet high up to the springing of the arched concrete roof. Each room has a verandah in front of it, 5 feet in clear width, provided with a masonry platform, 3 feet square, for bathing purposes, and a front dwarf wall, 4 feet high, for privacy. The end and cross partition walls are of 2nd class rubble masonry, 6 feet high to the springing of the concrete arched roofing. The roof for the main building, as well as the verandahs, is a concrete arch, with a rise of 1′ 9″, and thickness at the corner of 9 inches, and at the haunch of 2′ 6″, with a transverse slope of 3 inches to throw rain water off. The side and cross partition walls are 1′ 6″ thick, except the centre one of the latter, which is 2 feet. The end walls of main building and

verandahs are also 2 feet thick, but strengthened with buttresses to resist the thrust of the arch. All the masonry from foundations to springing line has been completed, and all the centring put up, and the concrete in 3 arches (6 rooms) and corresponding length of both verandahs finished during the year. The expenditure was Rs. 4,518, leaving Rs. 1,662 to complete the block.

2—ORDNANCE.

Bombay Defences.

22. A new export store-room, with an upper storey, for the Arsenal Show-room in the Grand Arsenal, Bombay, was commenced during the year. The internal dimensions of the ground floor rooms are 21′3″×39′, 24′ 3″×39′, and 2 central rooms of 55′ 6″×39′ each. The upper floor consists of a show-room 118′×40′, and an office room 22′×40′, the former approached by a stone staircase outside, and the latter by a wooden staircase inside. The building is of stone and lime masonry, teak joists and trusses, and Mangalore tiled roof. The estimated cost is Rs. 42,701, and the expenditure during the year Rs. 15,400.

23. A new store-shed in the Grand Arsenal, with a superstructure of iron columns and trusses, roofing of corrugated iron sheets, resting on concrete and masonry foundation and plinth, dimensions 160′×75′, was commenced during the year, and an expenditure of Rs. 13,180 was incurred, the estimated amount being Rs. 16,158.

24. In the Gun Carriage Factory, Colaba, a new timber-shed, 120′×30′, and a boiler-house, 37′×11′ 6″, attached, was commenced, and completed during the year at a cost of Rs. 6,705, against the sanctioned estimate of Rs. 7,102.

25. Other minor works at the Gun Carriage Factory were (1) removing and rebuilding foundations of vertical saw at a cost of Rs. 700; (2) rebuilding foundation of new vertical saw at a cost of Rs. 298; and enlarging the fitting shop, by constructing an additional room, 86′ 6″×24′, at a cost of Rs. 7,015.

Ahmedabad.

26. During the year quarters for 2 Conductors, with out-houses, have been built within the Fortified Post; the building is an upper-storeyed one, and is divided into 2 quarters, each comprising, on the ground floor, a sitting-room 18′×9′ 7½″, a sleeping room 17′ 7½″×9′ 10″, a bath-room and a godown, and on the first floor a sitting-room 18′×16′, a sleeping-room 18′×10′, and a bath-room.

27. There is a wooden staircase in the centre of the building common to both quarters, and a servants' staircase from outside to each quarter. The building has a verandah on the ground and first floors 10′ wide. The out-houses consist of one servants' room 10′×10″, and a cook-room 10′×10′, for each Conductor. A latrine of 3 seats has also been built on Colonel Ducat's standard plan for servants. The revised estimate for the new Ordnance Depôt, Ahmedabad, including these quarters, amounts to Rs. 1,20,032, and the total expenditure up to the end of 1886-87, Rs. 1,16,433, out of which Rs. 12,503 were spent during the past year; the only work that now remains to be done is the construction of a well similar to the one already completed.

Rájkot.

28. A new building for the Magazine at Rájkot has been constructed, at a cost of Rs. 5,863, for the storage of 240,000 rounds of small arms ammunition, which will occupy 429 boxes; but the accommodation is sufficient for 444 boxes, or 3·6 per cent. in excess of requirements. It measures 23 feet long, 16 feet broad, and 15 feet high from the top of the plinth. The superstructure of the building is of cut white stone and chunam, and the roof arched with block-in-course masonry, top of roof and soffit of arch plastered, floor of single teakwood joists, and 1½″ thick teak planks.

Kirkee.

29. Some buildings in the Small Arms Factory have been added. These comprise a fulminate of mercury manufacturing-house, a powder drying-house, 4 fire engine-sheds, and latrines.

Karáchi.

30. A timber-shed, 131′×26′, was constructed in the Arsenal enclosure at Karáchi. The roof, which is segmental, and formed of corrugated iron sheets on iron frames, rests on one side on the enclosure wall, and on the other side on posts of railway iron.

31. A new guard room, 24′×18′×14′ high, with a verandah, 7½ feet wide all round, was erected at the entrance to the Arsenal enclosure. The building is made of stone and lime, with a paved floor, and roof of mud plaster, carried on flat single tiles and teak trusses.

32. A loopholed masonry wall, 1,417′ long, and 10′ high, was constructed on the eastern side of the Arsenal enclosure. The flanking defence is made by 3 bastions with loopholes close together, and by the projection of the end wall of the store-room. Butresses are provided at intervals of 60′ for strength. The entrance gate at the south-east angle is 14′ wide between pillars of dressed stone. The gate itself is of angle iron framing, covered with corrugated iron sheets.

33. A tent-shed, 106′ × 36′, was also constructed entirely of angle iron; supporting a roof of angle iron principals, struts and purlins, covered with round bamboos, date-matting and mud plaster. The walls between the standards were made of unburnt brick and mud.

34. Further, an armourer's shop of stone and lime was constructed, containing three rooms, one 30′ × 30′, and one 30′ × 15′, and one drying-room, 10′ × 6′, with a verandah, 10½′ wide, on two sides. The building is fitted with three furnaces for browning, hardening, and blueing the barrels respectively. The hardening furnace is fitted with plate iron doors fitted to cast-iron frames.

3.—COMMISSARIAT BUILDINGS.

Belgaum.

35. At Belgaum, the only major work in progress was the new permanent slaughteries for the Commissariat Department, estimated to cost Rs. 20,001, the funds being supplied by the Southern Marátha Railway Company, in consequence of the site of the old slaughteries being required by the Company for its Belgaum Station. The work was commenced only in January last. Expenditure, Rs. 3,936. The buildings, it is expected, will be ready for use in October 1887.

Karáchi.

36. Two ranges of buildings were built for the transport animals attached to this Department—

In one range as below :—	
A mule infirmary	75′ × 10′8″
A pharmacy	27′ × 9′
An Equipment shed	66′ × 9′
In the other range—	
A cart-shed	168′ × 15′
And a gram-shed	15′ × 14′3″

All these sheds were made 9′ high to the trusses.

7.—GENERAL CANTONMENT WORKS.

Drainage.

Ahmedabad.

37. *Drainage of the Cantonment and Saddar Bazaar at Baroda.*—The scheme for this work, amounting to Rs. 30,467, was sanctioned by Government in their Resolution No. 344 M. W.—2088 of 20th December 1886, and an allotment of Rs. 10,000 was granted for expenditure in 1886-87; the project comprises two distinct parts, *viz.*, the drainage of the Sadar Bazaar and that of the Cantonment. The former consists of underground masonry ovoid sewers, and masonry surface channels, for the efficient discharge of the rain-water falling within the Sadar Bazaar limits into the nulla on the east, together with the restoration of an old masonry bund across the nulla, the construction of a masonry retaining wall to protect a portion of the right bank of the nulla from the scouring action of the water, and the construction of a 10-feet masonry culvert across the nulla up the bund. The estimated amount of this part of the drainage scheme is Rs. 27,703, out of which Rs. 1,720 have been spent during the year in nearly completing the culvert and the bund. The drainage of the Cantonment consists of 9 slab drains provided for passing the rain-water under the several Cantonment roads, and preventing it from lodging in various parts of the Cantonment. These drains have been completed during the year at a total expenditure of Rs. 2,911.

Water Supply.

Aden. Steamer Point Position.

38. *Removing and re-constructing the roofs of Condensed Water Tanks Nos. 1, 2 and 3.*—This is actually a repair work, but, under the rules in force, it is technically classed as original.

39. The roofs, being in a very dilapidated state, were removed, and new ones provided of 6-inch pumice mortar concrete with 1-inch lime plaster,

the concrete being carried on 2″ benteak planks, resting on benteak beams. It was originally intended to make the roof of tank No. 2 of concrete arching, but as this tank could not be thrown out of use by the Commissariat Department until very late in the official year, there was not sufficient time to carry out this idea, and the roof had to be renewed in the same manner as the roofs of the other two tanks. The expenditure was Rs. 2,299.

40. *New Condenser.*—In 1885-86, this building was finished, except a portion of the 9″ pipe to lead water into the intake tank, and the line of piping, to take the water by pumping, into a masonry tank near barrack No. 1. The idea of the inlet tank has been abandoned on the score of economy, as it has been found that a mere excavation, carried to the requisite depth, ensures the working of the condenser at full power, even when the tide is at its very lowest. This hole requires cleaning out occasionally to prevent sand being drawn into the pipes, but the expense on this account is very slight, compared with the cost of a masonry inlet tank, with piping.

41. The progress on the piping to the Barrack tank has been unexpectedly delayed by the non-receipt of the requisite bolts and washers, which, though ordered in October 1886, were not received till the end of March.

Karáchi.

42. The barracks occupied by European Troops and the Arsenal have had water laid on to them from the Municipal mains; the pipes are not taken into the men's barracks, but are taken into the wash-houses and non-commissioned officers' quarters; elsewhere stand-pipes are provided.

43. For the Native Troops two tanks have been provided, one at each flank, and the distribution is carried out by regimental arrangement.

8.—FORTIFICATIONS.

Bombay Defences.

44. Comparatively little work has been done during the year on the Special Defence Works of Bombay. Up to the 1st June 1886 the works then in progress were pushed on with all vigour. The difficulties of work during the monsoon, combined with the state of uncertainty regarding the whole scheme, rendered it advisable to cease work on that date. In December 1886, while awaiting a final decision on the scheme of defence, it was considered advisable to complete the unfinished works in some of the various batteries, and this was accordingly done. The following works were then carried out:—

Colába Point Battery	...	... Small additions to the sand-filling of parapet.
Oyster Rock Battery	...	... Continuing the gun emplacements, and demolition of certain of the old buildings.
Middle Ground Battery	...	... Commenced the gun emplacement, continued the concrete blocks, walling of boat basin, additions to stone-filling, &c.
Cross Island Battery	...	... Continuing the gun emplacements, with sand-filling to traverses, &c., and completion of shell-room.
Mahálakshmi Battery	...	... Completed the gun emplacement.
Malabár Point Battery	...	... No work was done here, pending the receipt of a new design.

45. In connection with the above, the Royal Artillery landed four heavy guns at the island batteries, and conveyed one to Malabár Point. It is anticipated that, by the end of June, five of the heavy guns will have been mounted, and one more in August. The total expenditure incurred during the year 1886-87 was Rs. 1,13,635, making a total of Rs. 2,23,935 from the commencement.

Ahmedabad.

46. At the south-east corner of the Cantonment, a Fortified Post, consisting of a wall and ditch, including a square of 200 yards, with

bastions at two corners, was commenced in 1884-85. The revised estimate for the Fort wall amounts to Rs. 84,197, out of which Rs. 52,667 have been spent up to end of 1886-87, the expenditure during last year being Rs. 27,298. Nearly three sides of the Fort have been more or less completed.

Karáchi. Completing No. 3 Battery and other Defences at Manora.

47. Beyond some small surveys made at Manora for some new forts, under directions from the Inspector-General of Fortifications, and taking up some land and a bungalow which came in the way of one of the sites of the proposed new forts, nothing has been done.

Protection of Manora Point.

48. The further protection of the west or sea-face of Manora Point, as recommended by the Defence Committee, was continued actively during the working season of 1886-87, on the revised design sanctioned, without any increase of the estimate of Rs. 1,09,943.

49. The work executed, as already reported, during the previous season (chiefly the rows of massive concrete and rubble blocks formed in tiers for a length of 220 feet) proved sufficient, as anticipated, for the immediate protection of the base of the cliff at that part, and for some distance on each side, during the south-west monsoon of 1886.

50. It did not, however, prevent the fall of a large mass of the brow of the cliff (at the north end of the protection), which had been previously undermined by the sea, but this fell in such a way as not to interfere with the future work of scarp walling, though giving a practical proof of the great need of timely protection.

51. The scarp walling for the protection of the clay base of the cliff above the tiers of concrete blocks, and extending also beyond them at either end (where the masses of conglomerate formerly fallen suffice as a foundation) was continued actively throughout the season of 1886-87, and was practically completed for a length of 550 out of the total length of 769 feet, by the 31st March.

52. It is hoped to continue the season's work up to the beginning of June, by which time the protection will have been substantially completed; leaving only a portion of the minor block work and pitching at the north end, for lengths of 120 and 240 feet respectively, to be completed after the coming south-west monsoon.

53. The conglomerate and shingle required for the work was obtained from the excavation of the fortification ditch across the point, the material of which has proved very useful, though unavoidably more costly than it would have been from the former quarry on the east face, which it has been necessary to relinquish owing to defence requirements.

54. The total expenditure in 1886-87 was Rs. 45,558, making a total to 31st March of Rs. 88,171, out of the total estimate of Rs. 1,09,943.

55. The usual ordinary repairs were done to the first portion of the cliff protection work completed in 1881-82, and which stands well.

Special repair to the stone facing, Manora Point.

56. The special repair of the portion of the stone facing along the east side of Manora Point, forming the frontage of the Sub-marine Defence buildings and ground, which was sanctioned at a cost of Rs. 3,540 (of which Rs. 1,002 was expended in 1885-86) was substantially completed before the south-west monsoon of 1886. The total cost has been Rs. 3,512, and the work appears likely to stand well, with the aid of the annual provision of Rs. 500 for current repairs of that portion of the stone facing; the remainder northwards along the deep-water point shore, being provided, as arranged, by the Karáchi Harbour Board (now Port Trust).

57. For this work also conglomerate lumps quarried from the fortification ditch, already referred to, were usefully employed.

Special repairs of Railway lines to Batteries.

58. Repairs to the Railway lines leading to the Batteries at Manora, were also carried out during the year, at a cost of Rs. 5,293.

59. These included renewal of decayed sleepers and corroded rails where required, also repairs to the pitching of the slopes and of the ballast where damaged by the extraordinarily high tides of June 1885, as well as ordinary repairs of the three miles of line, turntables, and rolling stock.

Aden Defences. Aden.

60. The work on the new Defences in Forts Morbat and Tarshyne, commenced in 1884-85, has progressed steadily during the 2½ years they have

been in progress, and their state at the close of 1886-87 may be described as follows, *viz.* :—

Fort Morbat.

Ditch work.—Complete, except a small quantity in right flank ditch, east, still in progress.

Magazines and Passages.—Complete.

Emplacements.—Complete as far as the information supplied by the War Office has permitted, except that of gun No. VIII.

Caponiers.—Complete, except a little trimming to the sides of the excavations of entrance and north-east caponiers.

Parades.—Complete, except a small quanti ty in the lower terreplein, on which work is in progress.

Ditches.—Escarp and counterscarp walls of front ditch complete. Patches of masonry for retaining the sides of ditches where loose materials have been met with, have been also completed, except in the right flank ditch, east.

Magazines and Passages.—Complete, with the following exceptions, *viz.* :—Magazines to guns Nos. III and VIII Passage from upper terreplein to gun No. VIII, and from the latter to the south-west caponier have not been roofed in, nor the staircase from the old fort to the north-east caponier.

Fort Tarshyne.

Emplacements.—Not commenced, as further details from the War Office are awaited.

Caponiers.—Masonry of one caponier only has been commenced.

Old Fort.—The masonry and concrete work connected with the alterations to the old Fort are about two-thirds complete.

Excavation in Rock.

Gorge east ditch	Completed.
„ west „	
Caponier	
Old Fort	
Casemate Battery ...	
Gorge work	Completed.
Musketry emplacements ...	
Main Magazine	

Scarping shore line.—Complete, except a little trimming work.

Main Battery.—Complete with magazines, except a little trimming to the medium gun emplacements, and a small quantity of excavation still required in Nos. III and VII gun emplacements.

Staircases.—From Old Fort to main Battery and gorge work about three-fourths complete.

Masonry.

Gorge, east ditch } Some patches required where the sides of the ditches
„ west „ } are in loose material.

Caponier	Complete.
Old Fort	
Gorge work ...	

Main Battery.—Only slight progress made, because sufficient details to enable the work to proceed continuously were received from the War Office so late in the official year. This work can now proceed regularly.

Casemate Battery.—Completed, except the roof, which has not yet been commenced.

61. A description of this work was given in the report for 1885-86. It has been completed according to the sanctioned design, except the concrete platforms of two of the guns, which are kept in abeyance. Telegraph Bay Battery.

62. Late in the official year arrangements were made to convert one of the magazines and one of the store-rooms into a guard-room for R. A. Lascars, by providing roof ventilation and a verandah in front of them. This work will be completed early in April 1887.

63. The expenditure on the three works noted above has been as follows during 1886-87 :—

	Rs.
Fort Morbat	2,28,417
„ Tarshyne	1,85,877
Telegraph Bay Battery	5,648

9.—DOCKYARD AND NAVAL BUILDINGS.

64. The extension of the godowns overlooking the Apollo Street was fully described in the last report. It was completed during the year at a total cost of Rs. 47,156, and handed over to the Dockyard authorities for use on the 7th January 1887. Bombay.

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